



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,159	02/05/2002	Hock Chuan Tan	MTI-31608	8043
22202	7590	07/14/2006		EXAMINER
WHYTE HIRSCHBOECK DUDEK S C				LE, THAO P
555 EAST WELLS STREET				
SUITE 1900			ART UNIT	PAPER NUMBER
MILWAUKEE, WI 53202				2818

DATE MAILED: 07/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/068,159	TAN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Thao P. Le	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) Responsive to communication(s) filed on 12 August 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) Claim(s) See Continuation Sheet is/are pending in the application.
  - 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-14, 24-31, 33-38, 47-50, 52, 112-119, 124-127, 137-139, 141, 144, 146, 149-161 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All    b) Some \* c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
 Paper No(s)/Mail Date 3 pages.
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: \_\_\_\_\_.

**Continuation of Disposition of Claims:** Claims pending in the application are 1-14,24-31,33-38,47-50,52,112-119,124-127,137-139,141,144,146 and 149-161.

## DETAILED ACTION

Claims 1-14, 24-31, 33-38, 47-50, 52, 112-119, 124-127, 137-139, 141, 144, 146, 149-161 are pending.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 03/23/06 was filed after the mailing date of the application. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### **Claim Rejections**

#### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-7, 11, 24-25, 33, 112-114, 124, 125, 149-150, 144, 146, 149-153, 160 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tuckerman et al., U.S. patent No. 5,804,004.

Regarding to claims 1-4, 24-25, 33, 112, 124, 144, 146, 149-153, 160, Tuckerman et al discloses a stacked die assembly, comprising at least two semiconductors dies (150A, 150CB) disposed on a substrate in a stacked arrangement, the substrate comprising a first surface having terminal pads disposed thereon (Fig. 4A); a first die 150A disposed on the first surface of the substrate having bond pads; a second die 150B comprising a first surface, a second surface, and a perimeter, the first surface having bond pads disposed thereon (top surface of die 150B), the second surface (attaching layer 188) having a recessed edge portion 190, the first die disposed within the recessed edge, the recessed edge portion having a height sufficient for clearance of the bonding elements extending from the bond pads of the first die (See Figs. 4A and 8). Still regarding claims 24-25, 124, Tuckerman et al discloses a third die 150C having a recessed edge portion and the second die disposed in the recessed edge portion of the third die.

Still regarding claims 1-4, 24-25, 33, 112, 124, 144, 146, 149-153, 160, Tuckerman fails to disclose the recess is non-beveled. However, the shape of the recess is not a significant limitation that makes the invention patentable. It would have been well known in the art that the shape could be modified. Note that the selection of

Art Unit: 2818

these parameters such as shape, energy, concentration, temperature, time, molar fraction, depth, thickness, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in shape, energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

In addition, applicant has not disclosed that the shape of the recess solves any stated problem or is for any particular purpose and it appears that the invention would perform equally well with beveled recess as disclosed in Tuckerman.

Regarding claims 5-7, 28-29, 34-36, 113, 152, Tuckerman et al discloses bonding elements 189, 190 connecting the bond pads of the second die to the terminal

Art Unit: 2818

pads on the substrate and at least one of an adhesive element disposed between the first die and substrate, between the second and first dies, second and third dies (182, 170, 188).

Regarding claims 11, 114, Tuckerman et al discloses the bonding element comprises a wire bond.

Regarding claim 125, Tuckerman et al discloses mounting the first die comprises a flip chip attachment.

Claims 8, 9, 26-27, 30-31, 37-38, 52, 119126-127, 137-139, 141, 144, 153 rejected under 35 U.S.C. 103(a) as being unpatentable over Tuckerman et al., U.S. patent No. 5,804,004, in view of Zuh Bernhard, DE 10209204 (IDS).

Regarding claims 26-27, Tuckerman et al. fails to disclose the recess is square, rectangular, oval, or circular shaped, however, Zuh Bernhard discloses the recess is square. It would have been obvious to one having ordinary skill in the art at the time the invention was made to form a recess having square, rectangular, oval, or circular shaped because such shapes of the recess would provide a clearance for another die or bond pads formed inside although the shape of the recess does not impart on the functions, manners, characteristics of the stacked assembly.

Regarding claims 8, 9, 30-31, 37-38, 52, 119126-127, 137-139, 141, 144, 153, it would have been obvious that the adhesive element comprises a tape adhesive and it would have been obvious to have the length and width of the second die is greater than

the first die since the selection of the parameters such as energy, concentration, temperature, time, molar fraction, depth, thickness, etc., would have been obvious and involve routine optimization which has been held to be within the level of ordinary skill in the art. "Normally, it is to be expected that a change in energy, concentration, temperature, time, molar fraction, depth, thickness, etc., or in combination of the parameters would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely degree from the results of the prior art ... such ranges are termed "critical ranges and the applicant has the burden of proving such criticality.... More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller* 105 USPQ233, 255 (CCPA 1955). See also *In re Waite* 77 USPQ 586 (CCPA 1948); *In re Scherl* 70 USPQ 204 (CCPA 1946); *In re Irmscher* 66 USPQ 314 (CCPA 1945); *In re Norman* 66 USPQ 308 (CCPA 1945); *In re Swenson* 56 USPQ 372 (CCPA 1942); *In re Sola* 25 USPQ 433 (CCPA 1935); *In re Dreyfus* 24 USPQ 52 (CCPA 1934).

Regarding claims 12-14, 47-50, 115-119-126-127, 137-139, 141, 154-161, Zehr Bernhard discloses the assembly is partially encapsulated and substrate having a leadframe, the substrate is selected from the group consisting of epoxy resin, ceramics, polyimide resins. It is inherent that the apparatus of Tuckerman and Zehr Bernhard is selected from the group consisting of a PCB, motherboard, program logic controller, and

Art Unit: 2818

testing apparatus and the apparatus is in electrical communication with an electrical apparatus.

When responding to the office action, Applicants' are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist the examiner to locate the appropriate paragraphs.

A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thao P. Le whose telephone number is 571-272-1785. The examiner can normally be reached on M-T (7-6).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on 571-272-1787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thao P. Le  
Primary Examiner  
Art Unit 2818  
July 8, 2006.